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# PRIEST RIVER EXPERIMENTAL FOREST

Annual Report 1985

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United States Department of Agriculture — Forest Service

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Reply to: 1380 Reports

Date: May 22, 1986

Subject: PREF Annual Report

To: INT Station Director, Larry Lassen

Enclosed for your information is the Priest River Experimental Forest Annual Report for 1985. This report reflects activities on the Forest during that calendar year.

Charles R. Hepner, Superintendent

Charles R. Hepner

Distribution:

Richard Krebill
James Brown, RWU 2108
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INTERMOUNTAIN RESEARCH STATION

Priest River Experimental Forest

# 1985 Annual Report

Charles R. Hepner

During 1985, numerous research programs, both new and ongoing, were the focus of a great deal of effort on the part of scientists from the Intermountain Research Station and cooperators from universities in Idaho, Washington, and Michigan. Additionally, the forest was the location of meetings, planning sessions, and educational tours. Personnel involved utilized living quarters, laboratory and office space, nursery areas, research forest lands and equipment, machines and supplies. Following is a summary of the research activities, facilities management, meetings and tours, and climatology for calendar year 1985.

# INTRODUCTION

Priest River Experimental Forest has been in existence since 1911, and in 1985 celebrated its 74th year of continuous operation. The contents of this report include information gathered from scientific recording instruments, maintenance reports and inspections, and information provided by scientists and other professional personnel regarding their activities on the Forest.

Table 1 is a summary of the number of man-days expended for the calendar year 1985 listed by project, laboratory location, university, or specific meeting. Total man-days of use were about one-half those of 1983 and 1984, due, for the most part, to the absence of a full-time student field crew utilizing the facilities. Also, there were fewer meetings and workshops. The project man-days, however, remained consistent with the last 2 years. For comparison, table 2 is a breakdown of use for the last six years.

Table 1.--Man-days expended at PREF for the calendar year 1985

| Project, User, Etc. | Man-days of use |
|---|---|
| RWU 1252 | 373 |
| RWU 1451 | 309 |
| RWU 1351 | 50 |
| Chinese Tour | 42 |
| University of Montana | 39 |
| IPNF FMO meeting | 28 |
| Washington State University | 28 |
| RWU 2108 (NFFL, Missoula) | 24 |
| RSS (Maintenance) | 22 |
| University of Idaho | 17 |
| RWU 1705 (FSL, Missoula) | 15 |
| Total | 947 |

Table 2.--Man-days expended at PREF 1980-1985

| | Research | Educational | National Forest | Other[1] | Total |
|---|---|---|---|---|---|
| 1985 | 793 | 84 | 28 | 42 | 947 |
| 1984 | 1,411 | 145 | 33 | 267 | 1,856 |
| 1983 | 1,712 | 842 | 48 | --- | 2,602 |
| 1982 | 606 | 210 | 93 | --- | 909 |
| 1981 | 486 | 654 | 36 | 129 | 1,305 |
| 1980 | 934 | 258 | 37 | 2,464[2] | 3,693 |

[1]Tours, meetings, planning sessions

[2]includes last YCC year, 2062 man-days

## Research Activities

### Silviculture of Cedar, Hemlock, Grand fir, and Douglas-fir Ecosystems and Forest Tree Diseases of the Northern Rocky Mountains (RWU 1252)

Research scientists, technicians, and students involved in masters and Ph.D. programs spent 373 man-days at the Experimental Forest in 1985. Continuing work was done on the Great North Idaho Bedding Experiment (GNIBE) and the North Idaho Fumigation Experiment (NIFE) and included height and root length measurements, root counts, mycorrhizae counts, and top and root weights of seedlings. Soil measurements included temperature, pH, moisture content, organic matter content, nitrate content, ammonium analysis, cation analysis and Cation Exchange Capacity. Figure 1 illustrates some of the work completed in the PREF laboratory facility, in this case, pH determination.

A total of 672 and 656 seedlings were sampled in the GNIBE and NIFE studies, respectively, over the summer field season.

As part of Bev Cornwall's master thesis work in conjunction with NIFE, carbon dioxide evolution was determined from soil taken from each bed (Figure 2). Root sections were isolated at each sample date and nematodes and rhizoplane organisms were identified. To monitor seedling response, Bev measured heights and weighed nursery tublings that had been inoculated with specific rhizoplane organisms.

Figure 1.--Laboratory facilities were utilized in determining soil pH from samples taken at the GNIBE site.

Figure 2.--Carbon dioxide evolution was determined by injecting $CO_2$ into samples from each type of bed.

As the initial step in a greenhouse study for Debbie Page-Dumroese's Ph.D. project, Douglas-fir cones were collected from two locations (North Ridge and the nursery) to determine organic matter effects on growth and to determine whether site and soil interact.

Personnel involved included R. Graham, J. Tonn, D. Dumroese, J. Buerkholtz, B. Cornwall, L. Rehfeldt, A. Harvey, M. Jurgensen, M. Klontz, C. Podolsky, C. Hepner.

Preliminary work on a new study involving fire and cutting practices was begun on Center Ridge. The general objective will be to test various prescribed underburns, applied in conjunction with shelterwood cutting, as techniques for obtaining natural regeneration of seral ponderosa pine on steep south facing slopes. Initial work by Priest Lake Ranger District and FSL personnel included site selection and layout of cutting units. Underburning will begin as soon as weather permits. Work was done by R. Graham, S. Arno, D. Zimmerman, J. Davis. Fireline was constructed by members of the PLRD fire crew.

Genetics and Pest Resistance of Rocky Mountain Conifers (RWU 1451)

Research scientists and technicians expended 309 man-days during the 1985 field season. Routine maintenance was performed on the White Pine Trait Study plantation and on the nursery. The nursery was also inspected for signs and quantity of gall rust. Several study sites were fertilized, including the White Pine Trait Study, the Grand Fir Provenance Test, and the White Pine Provenance Study. A section of the

nursery was prepared in anticipation of next years installation of two new studies, one on larch and one on ponderosa pine. To provide gopher and rabbit protection for the nursery, 1/2" mesh screen was added to the bottom of the newly completed fence. Growth data was taken on all established studies. Two studies were terminated, the arid lands Douglas-fir study at both the nursery and Tarlac areas and the Region 1 ponderosa pine study at the nursery. Personnel included R. Hoff, B. Hoff, G. McDonald, P. Wells, J. Rehfeldt, D. Coffen, D. Andrews, D. Joyce, M. Morton, A. Winter, A. Koehn, L. McCardell, J. Wells, Lu Way, B. Casorla.

Quantitative Analysis of Forest-Resource Responses for Planning, Management, and Control (RWU 1351)

Thirty-eight man-days were required by personnel from RWU 1351 to take measurements on selected permanent plots at PREF. These plots, some of the first established at the Forest, are of historical as well as scientific value, and included #110, 111, 112, 113, 114, 155 (Benton Flat area) and 117, 118 (Upper Benton Creek). A. Stage, B. Wykoff, D. Hamilton, M. Mouer, T. Jain, D. Renner, and J. DeGroot were involved in the work.

Range and Wildlife Habitat Ecology and Management (RWU 1705)

Personnel of project 1705 spent 15 man-days conducting field work in 1985. As in years past, the permanent forest succession plots in Benton Creek clearcut units A and B were measured. Peter Stickney, D.

Fields, and B. Campbell all of the Missoula FSL were involved in that work.

Fire Effects and Use (RWU 2108)

Scientists and technicians from the Intermountain Fire Sciences Laboratory spent 24 man-days involved in establishing a new study on Center Ridge at PREF. This study and the personnel involved are noted in the RWU 1252 section of this report.

# Administrative Activities

## Fire Protection

The fire protection equipment located at the headquarters was inspected on a regular basis and proved to be in satisfactory condition. Included in the inspection were outside hoses and cabinets, hydrants, alarms, heat sensors, building escape routes, and posted instructions. All fire extinguishers were located, inventoried, and then professionally inspected and recharged. During the fire season, the Forest was patrolled by Priest Lake Ranger District personnel and equipment. INT vehicles also carried fire suppression equipment when required. The Gisborne fire lookout tower was manned during the high fire hazard period. No fires were reported on the Forest during 1985.

Forest Roads Maintenance

Road maintenance, performed by Priest Lake Ranger District personnel, included South Ridge (597-B) Center Ridge (597-C), Canyon Creek (597-Q1), North Ridge (597-G), 597-B, and 597-D. Trees across or projecting into the roads were removed. Grading was not necessary this year but will be done in 1986. Major culverts were hand-brushed out, and the cattle guard on the main entrance road (597-A1) was cleaned out. The haul route to the Observatory Point sale area was maintained in accordance with the contract specifications. A survey was made to determine where and how much brushing will be needed to open up the main forest roads. Trees and shrubs, especially alder, are making travel increasingly difficult on major sections and should be removed within the next year.

Timber Sales

A combination of early, heavy snows and unfrozen ground caused a large amount of timber to go down in the Forest during the early part of the winter (Figure 3). The majority of these trees were along the major roads and necessitated several salvage sales to open the roads for travel early in the summer (Figure 3). Also, a narrow band between South Ridge and M-2 roads sustained a large amount of damage and a salvage sale was established in that area. The Observatory Firewood sale, started in August 1984 and scheduled for completion in November 1985, was extended to September 1986. A list of the sales are given in Table 3.

Figure 3.--Examples of down timber on South Ridge road (Upper photo) and A-2 road (lower photo) caused by snowfall and subsequently salvaged.

Table 3.--PREF timber sales for 1985

| Sale Name | Company/Contractor | Volume(MBF) |
|---|---|---|
| PREF-Benton | Norman Moriniti | 462 MBF (28 acres); 150 MBF removed in 1985 |
| PREF-Q1 | Rich Mendive | 7 MBF |
| PREF-597D | Norman Moriniti | 10 MBF |
| PREF-M2/South Ridge | Jeff Hahn | 10 MBF |
| PREF-AC/N7 | Darrell Brazington | 4 MBF |
| PREF-D/Q3 | Layout only; to be sold in 1986 | 160 MBF |
| Observatory Firewood (extended) | O. E. Cunningham | 794 MBF; 250 MBF removed in 1984; 400 MBF removed in 1985; remainder to be removed in 1986 |

## Climatic Information

Table 4 contains the monthly summary of daily temperatures recorded at Headquarters (Control) for 1985. Table 5 contains the monthly summary of daily precipitation data, also recorded at Headquarters for 1985. Averages, compiled from several years previous data, are included in each table for comparison. These records have been maintained for 74 consecutive years and are continuous and unbroken from 1911 to the present. This weather data is reported to local news media (Priest River Times) on a weekly/monthly basis and to the National Weather Service in Boise on a monthly basis. Upon request, the data is supplied to other government agencies, including state, county, and local as well as universities, schools, private industry, and individuals. These records have been utilized in numerous research papers and have been examined closely in one publication, Climate of Priest River Experimental Forest, Northern Idaho (GTR-INT-159).

A new record for minimum precipitation was set in January (0.27"). A new record for maximum average temperature was established in July (91.1°F). November temperatures were consistently cold and set records for both low average maximum and low average minimum (Table 4).

Table 4. Headquarters (control) monthly average temperature for 1985. Figures in Parentheses are 50 year averages (1912-1961)

| Month | Temperature (°F) | | | |
|---|---|---|---|---|
| | Average Maximum | | Average Minimum | |
| January | 24.7 | (30.3) | 17.4 | (16.6) |
| February | 29.8 | (36.4) | 15.1 | (18.3) |
| March | 42.8 | (45.3) | 22.0 | (23.5) |
| April | 56.5 | (57.6) | 30.1 | (29.6) |
| May | 70.1 | (66.7) | 40.1 | (36.6) |
| June | 75.8 | (73.5) | 43.1 | (42.5) |
| July | 91.1* | (83.1) | 49.1 | (45.5) |
| August | 77.3 | (82.1) | 46.6 | (43.4) |
| September | 62.5 | (70.4) | 39.7 | (37.4) |
| October | 50.8 | (56.6) | 33.6 | (32.1) |
| November | 26.8* | (39.6) | 16.3* | (26.7) |
| December | 25.4 | (32.5) | 16.4 | (21.1) |

*=New Record

Table 5.--Precipitation at three stations on Benton Creek for 1985.

Figures in parentheses are 22-year averages (1960-1982)

| Month | Precipitation (in inches) | | | | | |
|---|---|---|---|---|---|---|
| | Headquarters (elev. 2,344 ft.) | | Benton Dam (elev. 2,640 ft.) | | Benton Spring (elev. 4,775 ft.) | |
| January | 0.27* | (4.04) | 0.27 | (4.43) | 0.30 | (4.00) |
| February | 3.43 | (3.06) | 3.10 | (3.14) | 3.00 | (3.47) |
| March | 2.36 | (2.60) | 2.23 | (2.75) | 2.60 | (3.46) |
| April | 1.00 | (2.05) | 1.19 | (2.16) | 2.10 | (2.79) |
| May | 1.40 | (2.54) | 1.52 | (2.62) | 1.80 | (3.38) |
| June | 1.26 | (1.95) | 1.35 | (2.03) | 2.40 | (2.63) |
| July | 0.20 | (1.12) | 0.19 | (1.14) | 0.10 | (1.46) |
| August | 2.07 | (1.49) | 1.77 | (1.60) | 2.30 | (1.97) |
| September | 2.11 | (1.56) | 1.95 | (1.58) | 2.20 | (1.76) |
| October | 2.58 | (2.20) | 2.81 | (2.12) | 2.20 | (2.38) |
| November | 3.94 | (4.35) | 3.85 | (4.34) | 4.10 | (4.33) |
| December | 0.93 | (4.79) | 0.81 | (4.93) | 0.90 | (5.32) |
| Annual | 21.55 | (31.75) | 21.04 | (32.84) | 24.00 | (36.95) |

*=New Record

## Snow Survey

There are two snow courses, established in 1937, on the Experimental Forest. Benton Meadow snow course is located around the Headquarters at an elevation of 2,344 feet and is comprised of 15 stations at approximately 100-foot intervals. Benton Spring snow course lies along South Ridge road approximately 6 miles from Headquarters at 4,775 feet and contains 10 stations. Snow measurements begin on or near January 1 and continue on a monthly basis until snowmelt ceases on the lower course and until May on the upper course. Depth and weight of snow samples are used to determine water content in inches and percentages (Table 6). Gathering and reporting this data is a cooperative venture with the Soil Conservation Service, which uses the information to determine mountain snowpack and to predict runoff and water supply. Results of these measurements are shown in Table 6. Snow came early and persisted in greater-than-average depth at Benton Meadow. However, snow depth and water content at Benton Spring was generally close to average, the exception being the first measurement which was nearly double the normal amount.

Table 6. Snow depth and water content (in inches) from Benton Meadow and Benton Spring snow courses for 1985. Figures in parentheses are 25-year averages (1937-1961)

| Month | Benton Meadow (elev. 2,344 ft.) | | | | Benton Spring (elev. 4,775 ft.) | | | |
|---|---|---|---|---|---|---|---|---|
| | Snow Depth | | Water Content | | Snow Depth | | Water Content | |
| January | 27.1 | (12.0) | 6.1 | (2.7) | 52.2 | (30.9) | 14.7 | (8.4) |
| February | 19.8 | (19.4) | 5.9 | (4.8) | 46.2 | (46.8) | 16.0 | (13.7) |
| March | 28.5 | (19.3) | 9.0 | (6.0) | 57.8 | (55.3) | 19.6 | (18.4) |
| April | 21.3 | (6.2) | 8.6 | (2.3) | 66.6 | (22.1) | 21.4 | (20.4) |
| May | 0.0 | (0.0) | 0.0 | (0.0) | 29.2 | (34.0) | 13.4 | (14.8) |

## Facility Maintenance and Improvement

### Lodge

The basement bunkroom, generally used in times of personnel overflow, was improved considerably over the winter. An old concrete shower area was torn out and the walls were panelled with 1 x 6 tongue-and-groove fir. The concrete floor was repainted as was the ceiling and overhead pipes. A 6-foot electric baseboard heater was installed to alleviate dampness and musty odors. The adjoining laundry room was also panelled and floor and ceiling were painted. The walls and ceiling in the upstairs bathroom which were peeling and flaking were scraped and repainted.

Slight damage caused by snow creep to 2 of the aluminum roof shingles was repaired in the spring.

Other work included refilling and smoothing the excavation along the front wall which had sunk considerably over winter.

A badly needed larger capacity refrigerator was repaired and moved into the kitchen. The fuel oil furnace was professionally cleaned and serviced in the fall.

### Cottage #2

Little maintenance was required on cottage #2. All faucet washers were replaced and the furnace was professionally cleaned and serviced.

Cottage #3

Upgrading of the facility electrical system continued with the addition of a larger service to #3. The original 100 amp fuse-type breaker box was replaced with a new 200 amp breaker box. This was needed to better handle the basement baseboard heaters which were installed in 1980. A heating element which had burned out in the hot water tank was replaced. Bathroom maintenance included replacement of a clogged section of drain pipe in the upstairs shower and painting the downstairs walls and floor. Replacement of a loose soffet board was the only outside maintenance required.

Cottage #4

No maintenance was required on the superintendent's residence, with the exception of the furnace, which was professionally cleaned and serviced. A juniper which had been badly damaged by snow was removed from near the corner of the front porch.

Office-Laboratory

A photocell operated mercury vapor security light was mounted on the east end of the office. This was one of the two pole mounted lights that were taken down in 1984 during power line relocations. A new Canon

PC-20 copier was purchased to replace the old surplus copier which could not be repaired. A long bench was constructed to support the beaker agitating machines in the soils lab. The furnace was professionally cleaned and serviced.

Shop

The electrical improvements started in 1984 were completed. A 200 amp service box was installed, wired, and the old existing fuse box was removed. The other previously pole mounted security light was attached to the west end of the shop and wired in to provide lighting in that area.

Benton Flat Nursery

The fence enclosing the nursery area was completed with the addition of ½" wire mesh hardware cloth around the entire perimeter. The mesh was attached to the newly installed barb-wire fence and posts and extended below-ground several inches to provide protection from pocket gophers and rabbits.

## Meetings, Visits, Inspections

The Experimental Forest was the focus of several tours and meetings during 1985. Most notable was the visit by the delegation from the Peoples Republic of China. The five foresters and two interpreters were joined on the tour by Station Director Larry Lassen, Information Specialist Mike Prouty, and several project leaders from the Moscow FSL. Besides current research, the scientists were given a history of the Forest and facilities (Fig. 4). Other meetings and tours are listed below.

| | |
|---|---|
| April 19, 20 -- | University of Idaho Tree Improvement Class field trip; Lauren Fins plus 9 students. |
| April 27, 28 -- | Washington State University silviculture class field trip; Richard Mack plus 23 students. |
| May 19, 20 -- | University of Montana silviculture class field trip; George Blake plus 30 students (Figure 5). |
| June 5 -- | Idaho Panhandle National Forest Fire Management Officers tour; 28 participants. |
| June 25 -- | IPNF, Priest Lake Ranger District personnel tour; 25 participants. |
| September 5, 6 -- | Peoples Republic of China delegation tour; 13 participants (Figure 4). |
| October 3, 4 -- | Bob Pfister, former PREF superintendent, visit. |
| October 9, 10 -- | Yves Pirot, French forester, tour. |

Figure 4.--During a lighter moment in the tour, project leader Al Stage explains the list of members in the "Numbskull Club" to members of the Chinese delegation.

Figure 5.--University of Montana students standing in the nursery examining some of the earliest planting sites (background) at PREF.